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MR. SONNENSCHEIN: Hello. My name is Leonard Sonnenschein. I am president of St. Louis Children's Aquarium. At St. Louis Children's Aquarium we study the Mississippi River and its effect as a natural resource on our lives and on the lives of billions of other plants and animals.

- 1 The Mississippi River provides 70 percent of our nation's water resources and its boundaries as a resource begin in the east in the Appalachian Mountains and in the west in the Rocky Mountain Range. Drainage to the Mississippi River to the north and south is defined within the entire range of the United States and all the way into Canada as well. Along the drainage system that supplies this water resource 76 of the 103 operating commercial reactors are located. Most of the shipments of the radioactive materials designed for storage in the Yucca Mountain will pass through this water resource area.

The potential devastating effects of the gases released from the fission processes of the radioactive nuclides contained within the waste are yet unknown. What is the process and what happens to the gas and what gets potentially into the Mississippi River drainage system which will affect our food, our water and that for billions of plants and animals that live within this water resource range is also unknown. What would happen if an accident occurred and one of the shipments might fall into the water which would affect 70 percent of our nation's water resource? It would be very devastating.

- 2 I question the validity of the casks which are going to store these materials and their capability of keeping the fission products from escaping. My question is what would happen if one of these casks would fall? Has physical destructive properties been assessed for that type of situation? My suggestion is that these casks and these materials should be kept at their point of origin which have already been designed for safe handling. Furthermore, I think the best thing is to stop the continuous production of these materials.

If, after this testimony, and in due process of consideration, the Department of Energy decides to go ahead with the relocation process, my recommendation is to consider the safety issues associated with the radioactive material transportation, that road safety and train track safety be tested, shipment timetables approved. Have considerations been made for weather conditions, road conditions, traffic congestion, vacation travel?

- 4 Further, consideration should be made for the safest movement. If you're going to move these materials within this area between point A and point B for the transfer of these materials lie 70 percent of our nation's water resources, an area of water -- and without water there is not life -- that's going to affect billions of lives at some level. What is considered a safe contamination level for these products introduced in water resources? I would like to formally enter this document entitled "Radioactive Releases from Nuclear Power Plants of the Mississippi River Watershed," into my testimony, published by the Nuclear Information and Resource Service, as an exhibit to my testimony. Thank you.

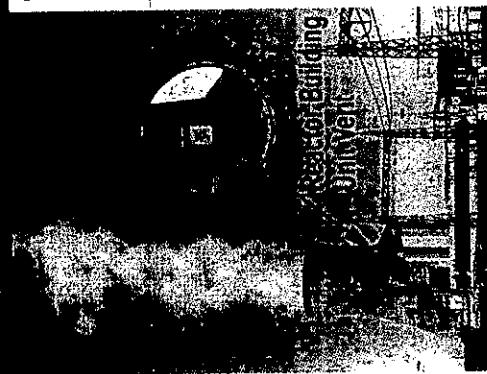
# RADIOACTIVE RELEASES FROM THE NUCLEAR

## POWER PLANTS

## OF THE MISSISSIPPI RIVER

## WHAT ARE THE DANGERS?

**Typical  
discharge  
points for  
gaseous  
and  
liquid**



**from  
nuclear  
power  
plants  
including:**

**planned  
releases  
from the  
reactor's  
routine  
operation**

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## Nuclear Plant Releases to Air, Water and Soil

8. Accurate, economically-feasible filtering and monitoring technologies do not exist for some of the major reactor by-products, such as radioactive hydrogen (tritium) and noble gases, such as krypton and xenon. Some liquids and gases are retained in tanks so that the shorter-lived radioactive materials can break down before the batch is released to the environment.

9. Government regulations allow radioactive water to be released to the environment containing "permissible" levels of contamination. **Permissible does not mean safe.** Detectors at reactors are set to allow contaminated water to be released, unfiltered, if below the "permissible" legal levels.

10. The Nuclear Regulatory Commission relies upon self-reporting and computer modeling from reactor operators to track radioactive releases and their projected dispersion. A significant portion of the environmental monitoring data is extrapolated – virtual, not real.

11. Accurate accounting of all radioactive wastes released to the air, water and soil from the entire reactor fuel production system is simply not available. The system includes uranium mines and mills, chemical conversion, enrichment and fuel fabrication plants, nuclear power reactors, and radioactive waste storage pools, casks, and trenches.

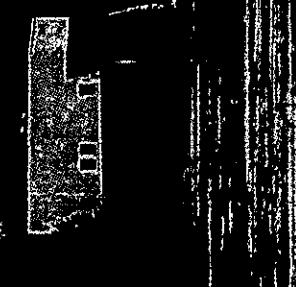
12. Increasing economic pressures to reduce costs, due to the deregulation of the electric power industry, could further reduce the already unreliable monitoring and reporting of radioactive releases. Deferred maintenance can increase the radioactivity released – and the risks.

13. Many of the reactor's radioactive by-products continue giving off radioactive particles and rays for enormously long periods – described in terms of "half-lives." A radioactive material gives off hazardous radiation for at least ten half-lives. One of the radioactive isotopes of iodine (iodine-129) has a half-life of 16 million years; technetium-99 = 211,000 years; and plutonium-239 = 24,000 years. Xenon-135, a noble gas, decays into cesium-135, an isotope with a 2.3-million-year half-life.

14. It is scientifically established that low-level radiation damages tissues, cells, DNA and other vital molecules – causing cell death (apoptosis), genetic mutations, cancers, leukemia, birth defects, and reproductive, immune and endocrine system disorders.

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Callaway Plant  
Water Intake Structure and  
Discharge Area  
on the Missouri River



**unplanned  
releases  
from  
leaks and  
accidents.**

**What you ARE NOT supposed to know:**

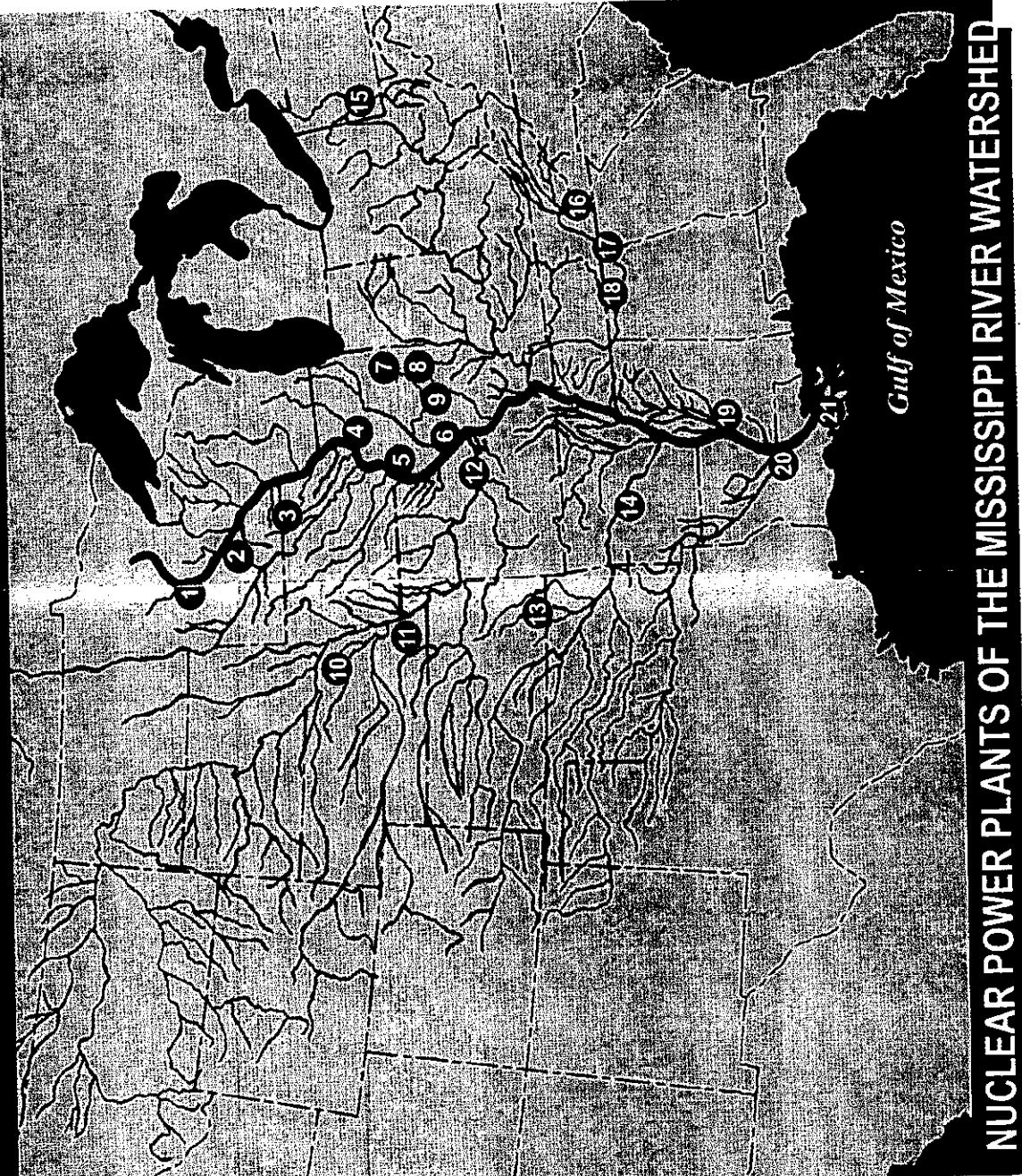
1. **It doesn't take an accident** for a nuclear power plant to release radioactivity into our air, water and soil. All it takes is the plant's everyday routine operation, and federal regulations permit these radioactive releases.
2. Radioactivity is measured in "curies." A large medical center, with as many as 1000 laboratories in which radioactive materials are used, may have a combined inventory of only about two curies. In contrast, an average operating nuclear power reactor will have approximately 16 billion curies in its reactor core. This is the equivalent radioactivity of at least 1,000 Hiroshima bombs.

3. A reactor's fuel rods, pipes, tanks and valves can leak. Mechanical failure and human error can also cause leaks. As a nuclear plant ages, so does its equipment – and leaks generally increase.

4. Some contaminated water is intentionally removed from the reactor vessel to reduce the amount of the radioactive and corrosive chemicals that damage valves and pipes. This water is filtered and then either recycled back into the cooling system or released into the environment.

5. A typical 1000-megawatt pressurized-water reactor (with a cooling tower) takes in 20,000 gallons of river, lake or ocean water per minute for cooling, circulates it through a 50-mile maze of pipes, returns 5,000 gallons per minute to the same body of water, and releases the remainder to the atmosphere as vapor. A 1000-megawatt reactor without a cooling tower takes in even more water – as much as one-half million gallons per minute. The discharge water is contaminated with radioactive elements in amounts that are not precisely known or knowable, but are biologically active.

6. Some radioactive fission gases, stripped from the reactor cooling water, are contained in decay tanks for days before being released into the atmosphere through filtered rooftop vents. Some gases leak into the power plant buildings' interiors and are released during periodic "purges" or "venting." These airborne gases contaminate not only the air, but also soil and water.
7. Radioactive releases from a nuclear power reactor's routine operation often are not fully detected or reported. Accidental releases may not be completely verified or documented.

**NUCLEAR POWER PLANTS OF THE MISSISSIPPI RIVER WATERSHED**

1. Monticello
2. Prairie Island 1 & 2
3. Duane Arnold
4. Byron 1 & 2
5. Quad Cities 1 & 2
6. LaSalle 1 & 2
7. Dresden 2 & 3
8. Braidwood 1 & 2
9. Clinton
10. Ft. Calhoun
11. Cooper
12. Callaway
13. Wolf Creek
14. Arkansas Nuclear One, 1 & 2
15. Beaver Valley 1 & 2
16. Watts Barr
17. Sequoyah 1 & 2
18. Browns Ferry 2 & 3
19. Grand Gulf
20. River Bend
21. Waterford 3

**TOTAL REACTORS: 31**